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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/670,673      | 09/25/2003  | Bruce K. Wachtmann   | 2550/185            | 6398             |

2101 7590 04/24/2006

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| EXAMINER |
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PIZARRO CRESPO, MARCOS D

|          |              |
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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2814

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/670,673

Applicant(s)

WACHTMANN, BRUCE K.

Examiner

Marcos D. Pizarro-Crespo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-5 and 7-20 is/are pending in the application.
- 4a) Of the above claim(s) 9-14 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7,8 and 15-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1,3-5 and 7-20 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

Attorney's Docket Number: 2550/185

Filing Date: 9/25/2003

Claimed Priority Date: 12/3/2002 (CIP of 10/308,688)

Applicant(s): Wachtmann

Examiner: Marcos D. Pizarro-Crespo

### **DETAILED ACTION**

This Office action responds to the amendment filed on 2/23/2005.

#### ***Acknowledgment***

1. The amendment filed on 2/23/2005 responding to the Office action mailed on 11/28/2005 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1, 3-5, and 7-20.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-5, 7, 8, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Montague (US 5798283) in view of Kim (US 6500763) and Lee (US 6160314).

4. Regarding claim 1, Montague shows (see, e.g., fig. 1) most aspects of the instant invention including a method of forming a surface micromachined MEMS device **12**, the method comprising:

- ✓ Providing a substrate **14**
- ✓ Applying an insulating layer **22** on the substrate **14** (see, e.g., col.5/ll.30-35)
- ✓ Depositing a conductive path **24** directly on the insulating layer **22**
- ✓ Forming circuitry **16** and structure **26**
- ✓ Connecting the path **24** between the circuitry **16** and the structure **26**

wherein:

- ✓ The conductive path **24** is capable of transmitting an electronic signal between the circuitry **16** and the structure **26**
- ✓ The insulating layer **22** spaces the path **24** from the substrate **14**
- ✓ The device **12** is free of semiconductor junctions formed by the substrate **14** and the conductive path **24**

Montague, however, fails to show the conductive path directly on an oxide layer. He differently teaches the conductive path being deposited directly on a nitride layer, which is to be used as a polishing stop layer and as an etch stop layer (see, e.g., col.5/ll.39-47).

Kim (see, e.g., col.4/ll.15-20) and Lee (see, e.g., col.2/ll.55-60), on the other hand, teach an oxide layer to be an equivalent material to Montague's nitride layer for its use as an etch/polish stop layer. They further add that this oxide layer has a high polishing and etching selectivity, the same as Montague's nitride layer.

Therefore, it would have been obvious at the time of the invention to one of ordinary skill in the art to use either an oxide or a nitride in Montague's method because these were recognized in the semiconductor art for their use as etch/polish stop materials, as taught by Kim and Lee, and the selection of any of these known equivalents would be within the level of ordinary skill in the art.

5. Regarding claims 3 and 16, Montague shows the structure **26** is electrically isolated from the substrate **14** (see, e.g., fig. 1).

6. Regarding claims 4 and 18, Montague shows (see, e.g., fig. 10) the method further comprising:

- ✓ Applying an additional insulator **42** above the conductive path **24**
- ✓ Depositing an additional conductive path **44** to the additional insulator **42**

wherein the conductive path **24** and the additional conductive path are in different planes of the device.

7. Regarding claim 5, Montague shows the method further comprising electrically connecting the conductive path **24** and the additional conductive path **44** with a connector **28**, the connector **28** being one of a via and a staple (see, e.g., fig. 10).

8. Regarding claim 7, Montague shows the substrate **14** is free of embedded electrodes (see, e.g., fig. 2).

9. Regarding claim 8, Montague shows the conductive path **24** comprises polysilicon (see, e.g., col.6/ll.47).

10. Regarding claim 15, Montague shows (see, e.g., fig. 1) all aspects of the instant invention including a method of forming a sensor, the method comprising:

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- ✓ Forming an oxide **22** on a substantially intrinsic semiconductor substrate **14**  
(see, e.g., col.5/ll.30-35 and col.4/ll.45)
- ✓ Forming a conductive path **24** on the oxide **22**
- ✓ Forming circuitry **16** and structure **26**
- ✓ Connecting the path **24** between the circuitry **16** and the structure **26**

wherein:

- ✓ The oxide **22** and the conductive path **24** are formed by surface micromachining processes (see, e.g., col.5/ll.50-55)
- ✓ The oxide **22** electrically isolates the conductive path **24** from the substrate **14**
- ✓ The conductive path **24** is capable of transmitting an electronic signal between the circuitry **16** and the structure **26**

Montague, however, fails to show the conductive path directly on an oxide layer. He differently teaches the conductive path being deposited directly on a nitride layer, which is to be used as a polishing stop layer and as an etch stop layer (see, e.g., col.5/ll.39-47).

Kim (see, e.g., col.4/ll.15-20) and Lee (see, e.g., col.2/ll.55-60), on the other hand, teach an oxide layer to be an equivalent material to Montague's nitride layer for its use as an etch/polish stop layer. They further add that this oxide layer has a high polishing and etching selectivity, the same as Montague's nitride layer.

Therefore, it would have been obvious at the time of the invention to one of ordinary skill in the art to use either an oxide or a nitride in Montague's method because these were recognized in the semiconductor art for their use as etch/polish stop

materials, as taught by Kim and Lee, and the selection of any of these known equivalents would be within the level of ordinary skill in the art.

11. Regarding claim 17, Montague shows the MEMS device 12 is free of semiconductor junctions between the substrate 14 and the conductive path 24 (see, e.g., fig. 1).

12. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Montague/Kim/Lee in view of Fladre (US 2004/0152272).

13. Regarding claim 19, Montague/Kim/Lee shows most aspects of the instant invention (see, e.g., paragraph 10 above). Kim/Lee, however, fails to specify the thickness of the oxide layer. Montague, on the other hand, shows the insulating layer comprising an oxide layer having a thickness of about .06  $\mu\text{m}$  (see, e.g., col.5/ll.30-32) but also fails to show the claimed thickness of .15 to 1.5  $\mu\text{m}$ . However, differences in thickness will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such differences are critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454,456,105 USPQ 233, 235 (CCPA 1955). Along these lines, Fladre teaches (see, e.g., par. 0050) that the larger the thickness of Kim/Lee's oxide layer is, the more the parasitic capacitance between the conductive path and the substrate will be reduce. The original thickness of Fladre's oxide layer ranges from .400 to 1.000  $\mu\text{m}$  (see, e.g., par. 0048).

Based on the teachings of Fladre, the specific claimed thicknesses, are only considered to be the "optimum" thicknesses disclosed by Montague/Kim/Lee that a

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person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired reduction in parasitic capacitance, manufacturing costs, etc. (see Boesch, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, *i.e.*, results which are different in kind and not in degree from the results of the prior art, will be obtained as long as an oxide insulator separates the conductive path from the substrate, as already suggested by Montague/Kim/Lee.

Accordingly, since the applicants have not established the criticality (see next paragraph below) of the stated thicknesses and since these thicknesses have been in common use in similar devices in the art, as shown by Fladre, it would have been obvious to one of ordinary skill in the art to use these values in the method of Montague/Kim/Lee.

#### CRITICALITY

14. The specification contains no disclosure of either the critical nature of the claimed thicknesses or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

#### ***Response to Arguments***

15. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP



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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

17. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

18. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

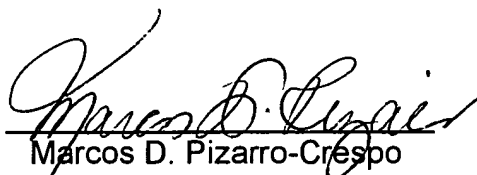
19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 10:00 AM to 8:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via [Marcos.Pizarro@uspto.gov](mailto:Marcos.Pizarro@uspto.gov). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

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20. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

21. The following list is the Examiner's field of search for the present Office Action:

| Field of Search                                | Date      |
|--|-----------|
| U.S. Class / Subclass(es): 438/52, 453         | 4/13/2006 |
| Other Documentation: PLUS Analysis             | 5/12/2005 |
| Electronic Database(s): EAST (USPAT, EPO, JPO) | 4/13/2006 |

  
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